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METHOD FOR DETERMINATION OF
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METHOD FOR DETERMINATION OF ERGOT IN FOODGRAINS

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Indian Standard

METHOD FOR DETERMINATION OF ERGOT IN FOODGRAINS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 August 1976, after the draft finalized by the Foodgrains and Foodgrain Products Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Bajra is often infested with ergot in the country. However, in imported wheat also, ergot infestation has been reported. Ergot is the dried sclerotium of *Claviceps purpurea* (Fries.) Tulsane. For the foodgrains specially the wheat used for blending to improve the quality of flour for the requirements of different industries, it was felt that maximum limit for the toxic material should be specified. It was, therefore, felt necessary that a method should be developed to detect and estimate the presence of ergot in the foodgrains.

0.2.1 Ergot is a fungal disease of grains which forms a hard purple slightly curved body in the ear in place of the kernel, usually considerably larger than normal kernel. Ergot produces ergotoxin and occurs in rye, millets and wheat.

0.3 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard prescribes the method for determination of ergot in foodgrains.

2. SAMPLING

2.1 Representative samples of the material shall be drawn according to the method prescribed in IS : 2814-1964†.

*Rules for rounding off numerical values (*revised*).

†Methods for sampling of cereals and pulses.

3. QUALITY OF REAGENTS

3.1 Unless specified otherwise, pure chemicals and distilled water (see IS : 1070-1960*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the experimental results.

4. QUALITATIVE DETERMINATION

4.1 Reagents

4.1.1 *Petroleum Ether* — boiling point 40 to 60°C.

4.1.2 *Solvent Ether*

4.1.3 *Dilute Ammonia (m/m)* — 10.0 percent.

4.1.4 *Tartaric Acid Solution* — 1 percent (freshly prepared).

4.1.5 *p-Dimethyl Amino Benzaldehyde (PDAB) Solution* — Prepare by dissolving 0.125 g of PDAB in a cold mixture of 65 ml concentrated sulphuric acid and 35 ml of distilled water. To this, add 0.1 ml of 5 percent ferric chloride solution and let it stand for 24 hours before use.

4.2 Apparatus

4.2.1 *Grinding Mill*

4.2.2 *Electric Shaker*

4.3 Procedure

4.3.1 Grind about 50 g of the sample in a grinding mill to a fine powder to pass through 100-micron IS Sieve (IS : 460-1962†).

4.3.2 Take 10 g of the powdered sample (see 4.3.1) in a stoppered conical flask. Add sufficient petroleum ether. Shake for half-an-hour in an electric shaker. Allow to settle and decant off the petroleum ether. Dry the material in air. Add to the material 8 ml of dilute ammonia and sufficient quantity of solvent ether. Again shake for half-an-hour. Filter the ether portion in a beaker. Concentrate to a small volume. Add 2 ml of tartaric acid solution to the beaker, and shake thoroughly. Mix 1 ml of this tartaric acid-sample solution with 1 to 2 ml of *p*-dimethyl amino benzaldehyde solution. Blue colour indicates the presence of ergot.

*Specification for water, distilled quality (revised).

†Specification for test sieves (revised).

5. QUANTITATIVE ESTIMATION

5.1 Reagents

5.1.1 Extraction Mixture — 9 ml methyl alcohol + 1 ml concentrated ammonia + 90 ml chloroform.

5.1.2 Chloroform

5.1.3 Ether — anaesthetic grade.

5.1.4 Sulphuric Acid — 0.2 N.

5.1.5 p-Dimethyl Amino Benzaldehyde (PDAB) Solution — Prepare as given under 4.1.5.

5.1.6 Ergometrine Maleate

5.2 Apparatus

5.2.1 Spectrophotometer

5.3 Procedure

5.3.1 Treat 10 g of moderately-fine powder of the sample with the extraction mixture. Shake well for five minutes and add 50 ml of chloroform and 4 ml of distilled water. Again shake it for few minutes and allow it to separate. Filter the contents through glass wool. Repeat extraction for two times by using 25 ml of the extraction mixture. Evaporate the combined extract in vacuum taking care that the temperature does not exceed 40°C.

5.3.2 Dissolve the dried residue in 80 ml of the ether followed by two times 8 ml of sulphuric acid. Wash the extract with 50 ml of ether. Filter it through the glass wool and wash the filtrate with water. Dilute it with water and combine the filtrate and washing to make exactly 50 ml.

5.3.3 Take 5 ml from the diluted portion and dilute it with water to make it 25 ml. From this, take 10 ml and develop the colour with 20 ml PDAB. Read the optical density after 30 minutes at 590 nm. Use blank containing 10 ml distilled water and 20 ml PDAB. Draw the standard curve from a commercial ampoule which contains 0.2 mg of ergometrine maleate. Prepare several dilutions and mix with twice its volume of PDAB test solution. Calculate the total ergotoxin content by the following:

1 mg of ergometrine maleate = 1.37 mg of total ergotoxin.

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INDIAN STANDARDS ON FOODGRAINS AND FOODGRAIN PRODUCTS

IS :

1009-1968	MAIDA (first revision)
1010-1968	SUJI or RAVA (semolina) (first revision)
1155-1968	Wheat ATTA (second revision)
1156-1957	Pearl barley
1157-1957	Barley powder
1158-1973	Corn flakes (first revision)
1484-1974	Rolled oats (quick-cooking type) (first revision)
1485-1976	Macaroni, spaghetti and vermicelli (first revision)
2234-1962	IDLI mix
2400-1976	BESAN (first revision)
2404-1972	Malt extract (first revision)
2639-1972	PAPAD (first revision)
2813-1970	Terminology for foodgrains (first revision)
2814-1964	Method for sampling of cereals and pulses
2815-1964	Slotted tube sampler
2816-1964	Grain sampler (PARKHI type)
2821-1964	Thermo-sampler
3714-1966	Method for sampling of bigger size foodgrains
3729-1966	Corn sampler (PARKHI type)
4333	Methods of analysis for foodgrains
	(Part I)-1967 Refractions
	(Part II)-1967 Moisture
	(Part III)-1967 Determination of hectolitre weight
	(Part IV)-1968 Weight of 1 000 grains
	(Part V)-1970 Determination of uric acid
4782-1968	Method for the determination of sedimentation value of wheat (flour)
4940-1968	Sample divider
5315-1969	Methods of sampling for milled cereals and pulses products
6261-1971	Methods of analysis for detection of insect and rodent contamination in grains and milled products
6894-1973	Malting barley
6895-1973	Barley malt
7462-1974	Improver wheat
7463-1974	Wheat flour for use by biscuit industry
7464-1974	Wheat flour for use in bread industry
8162-1976	Method for determination of wet gluten in wheat flour
8184-1976	Method for determination of ergot in foodgrains

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